Fig. 1

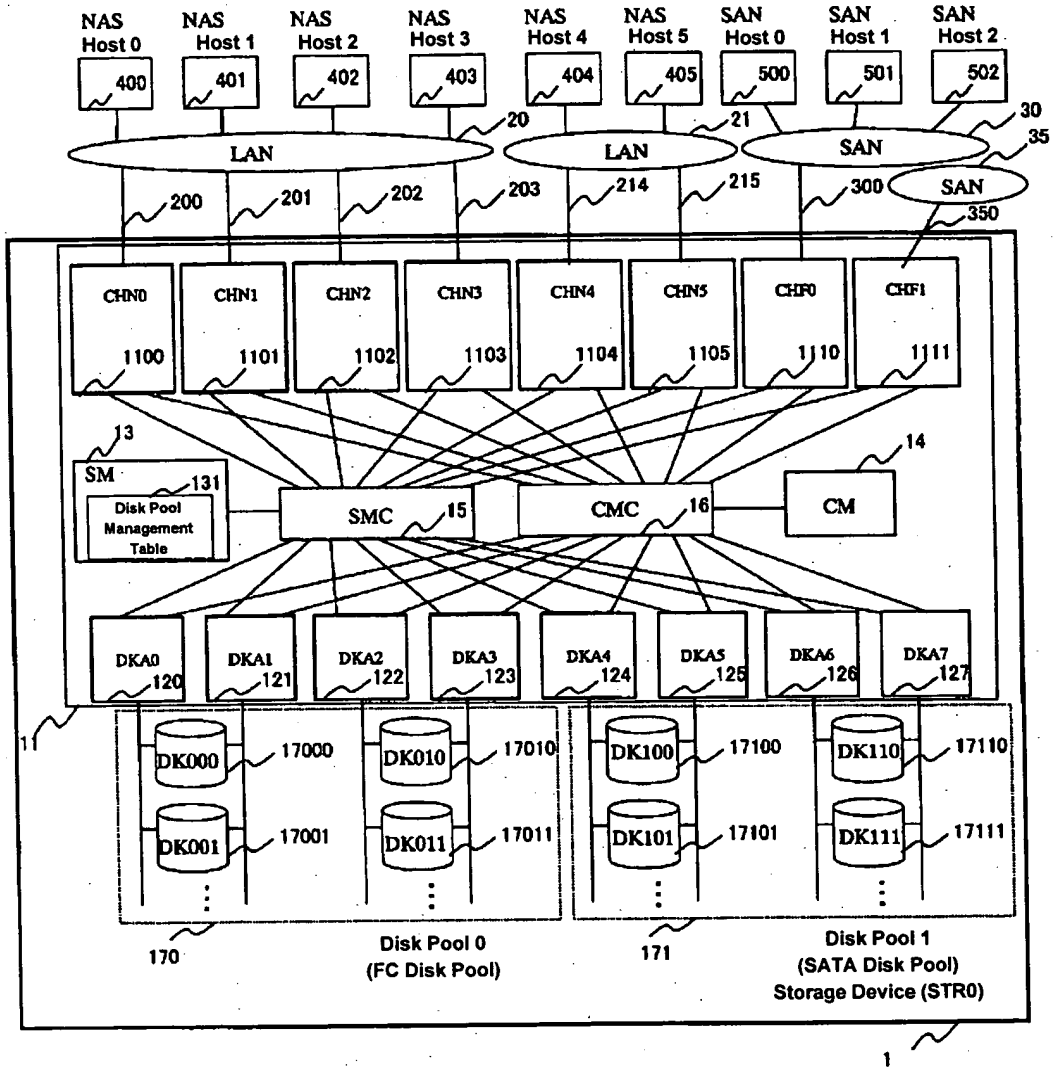

NAS Host 0
NAS Host 1
NAS Host 2
NAS Host 3
NAS Host 4
NAS Host 5
SAN Host 0
SAN Host 1
SAN Host 2
400
401
402
403
404
405
500
501
502
20
21
30
35
LAN
LAN
SAN
SAN
200
201
202
203
214
215
300
350
CHN0
CHN1
CHN2
CHN3
CHN4
CHN5
CHF0
CHF1
1100
1101
1102
1103
1104
1105
1110
1111
13
SM
131
Disk Pool Management Table
SMC
15
CMC
16
CM
14
DKA0
DKA1
DKA2
DKA3
DKA4
DKA5
DKA6
DKA7
120
121
122
123
124
125
126
127
1
DK000
DK001
DK010
DK011
DK100
DK101
DK110
DK111
17000
17001
17010
17011
17100
17101
17110
17111
170
171
Disk Pool 0
(FC Disk Pool)
Disk Pool 1
(SATA Disk Pool)
Storage Device (STR0)
1

Fig. 2

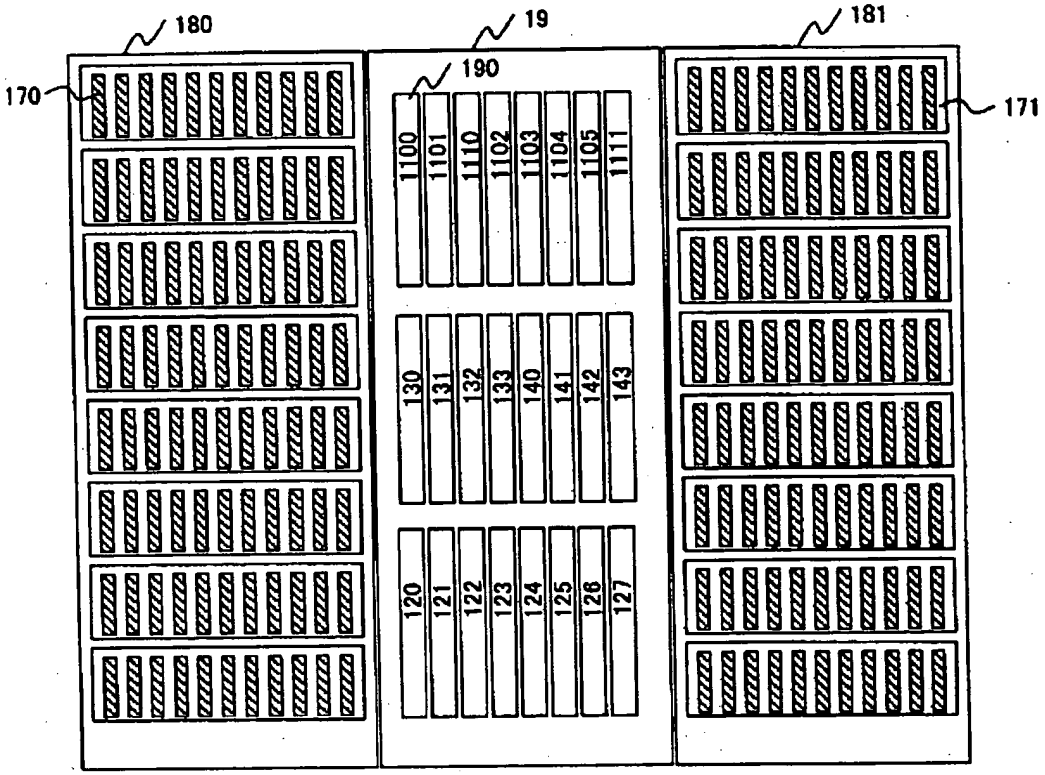

180
19
181
190
170
171
1100
1101
1110
1102
1103
1104
1105
1111
130
131
132
133
140
141
142
143
120
121
122
123
124
125
126
127

Fig. 3

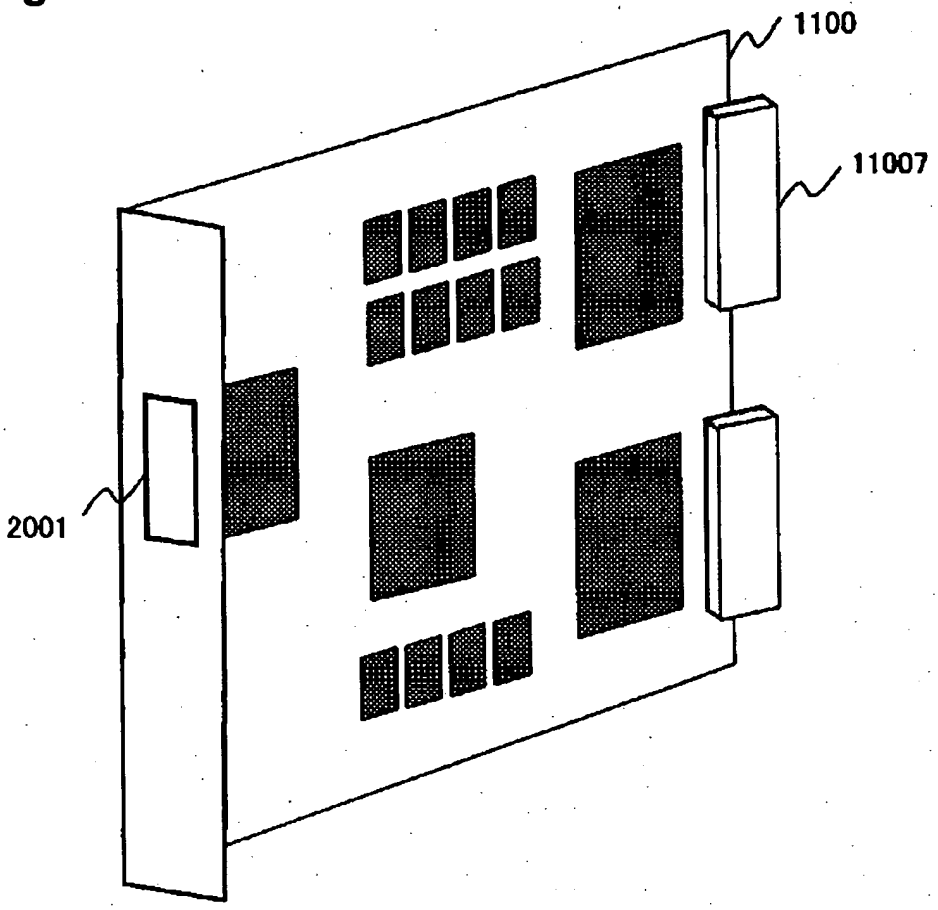


Fig. 4

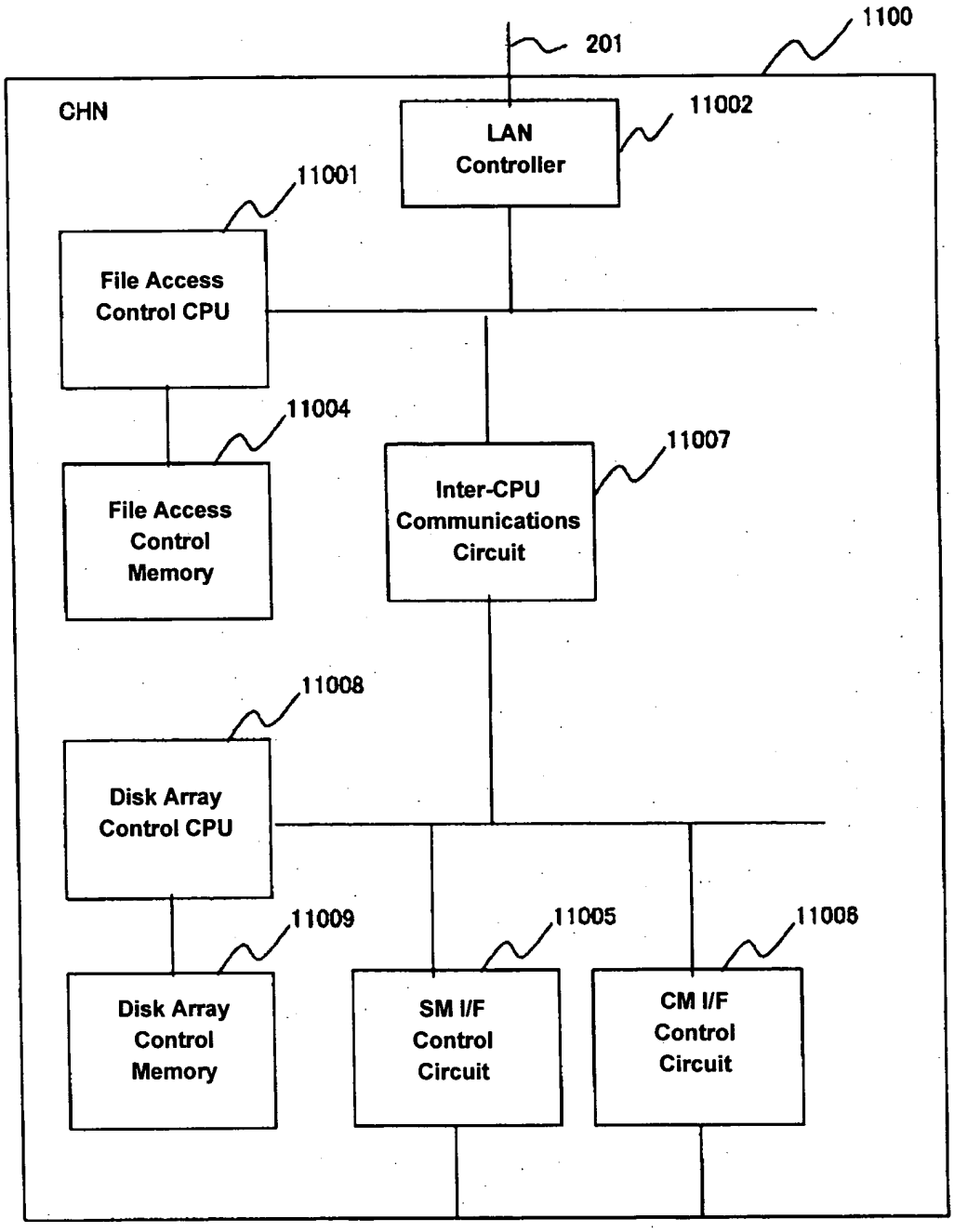

1100
201
CHN
LAN Controller
11002
11001
File Access Control CPU
11004
File Access Control Memory
11007
Inter-CPU Communications Circuit
11008
Disk Array Control CPU
11009
Disk Array Control Memory
11005
SM I/F Control Circuit
11006
CM I/F Control Circuit

Fig. 5

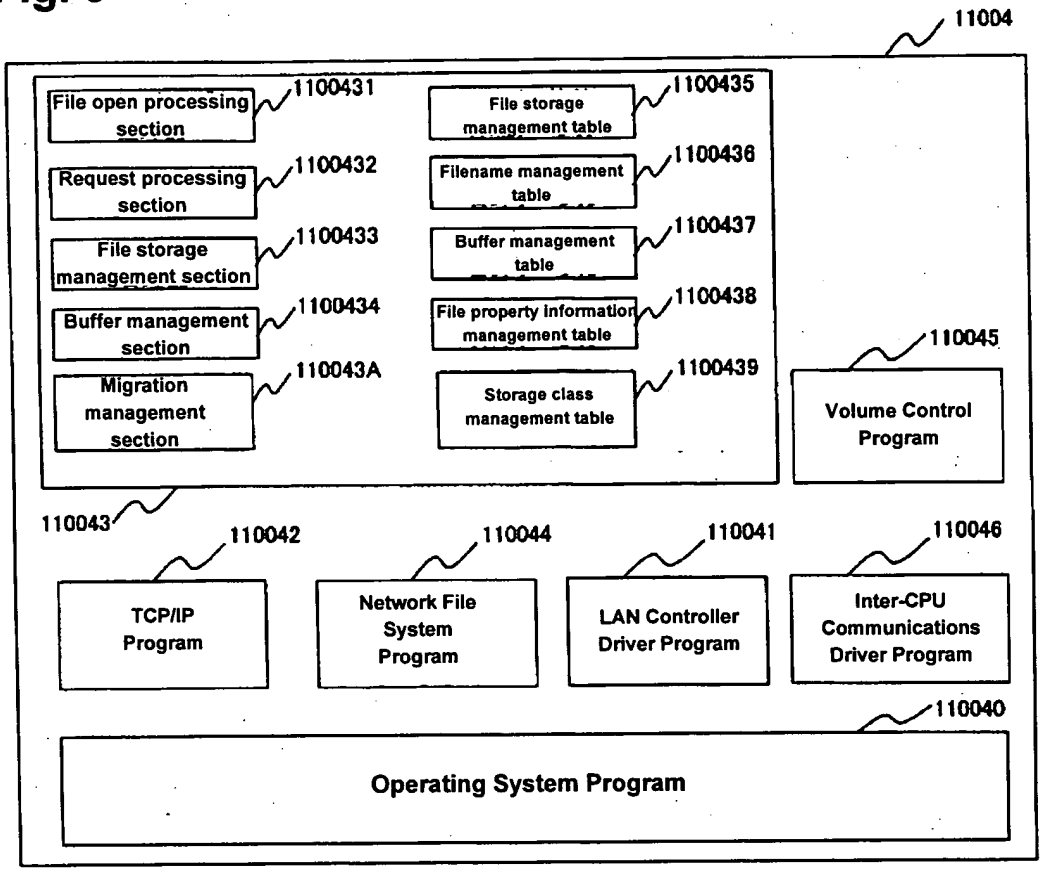

11004
File open processing section
1100431
Request processing section
1100432
File storage management section
1100433
Buffer management section
1100434
Migration management section
110043A
File storage management table
1100435
Filename management table
1100436
Buffer management table
1100437
File property information management table
1100438
Storage class management table
1100439
110045
Volume Control Program
110043
110042
TCP/IP Program
110044
Network File System Program
110041
LAN Controller Driver Program
110046
Inter-CPU Communications Driver Program
110040
Operating System Program

Fig. 6

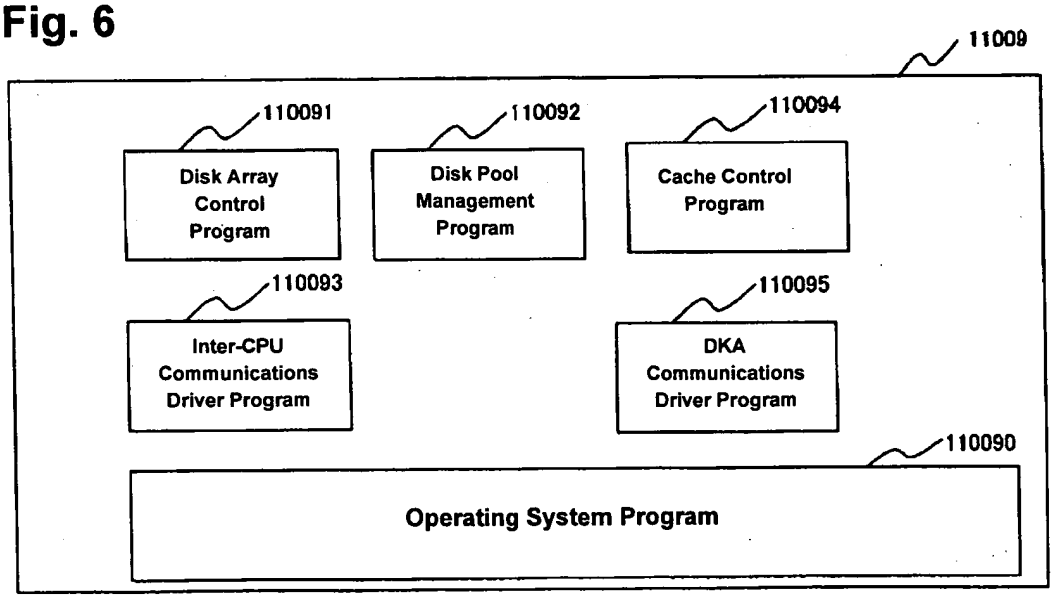

11009
110091
Disk Array Control Program
110092
Disk Pool Management Program
110094
Cache Control Program
110093
Inter-CPU Communications Driver Program
110095
DKA Communications Driver Program
110090
Operating System Program

Fig. 7

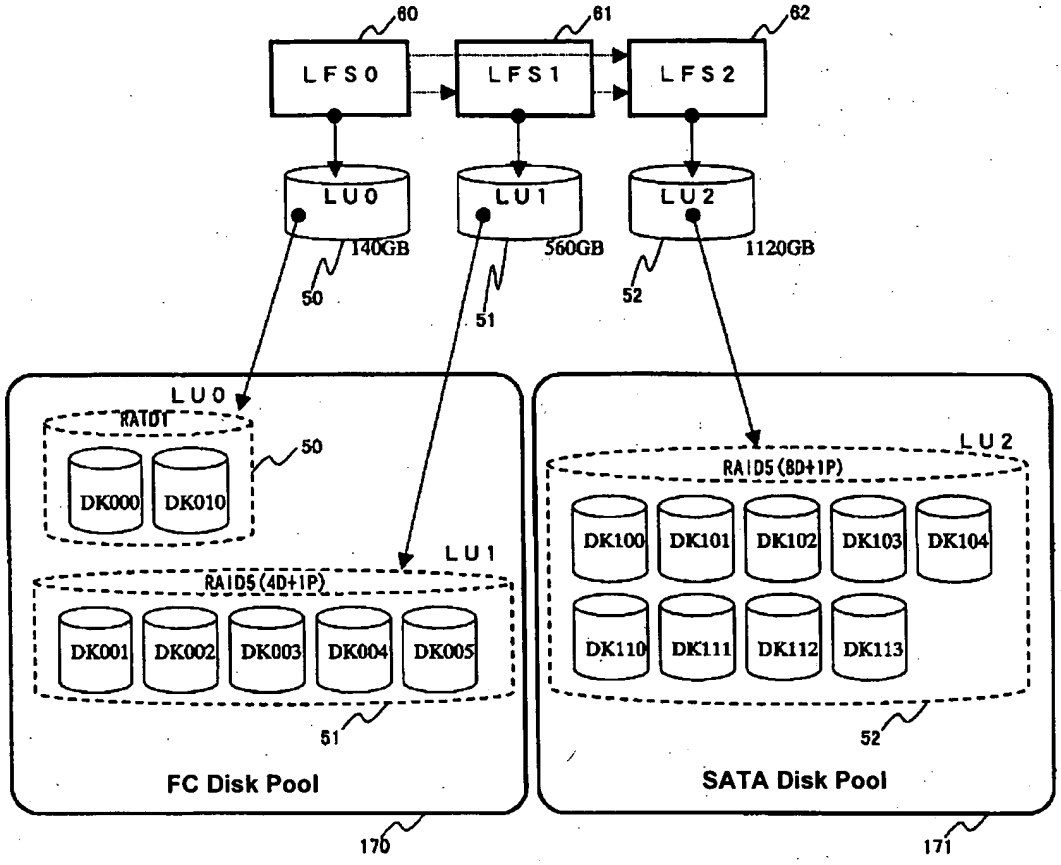

60
61
62
LFS0
LFS1
LFS2
LU0
LU1
LU2
140GB
560GB
1120GB
50
51
52
LU0
RAID1
DK000
DK010
LU1
RAID5(4D+1P)
DK001
DK002
DK003
DK004
DK005
FC Disk Pool
170
LU2
RAID5(8D+1P)
DK100
DK101
DK102
DK103
DK104
DK110
DK111
DK112
DK113
SATA Disk Pool
171

Fig. 8

Storage Class Management Table 1100451

Storage Class# (1100451a)	Storage Node# (1100451b)	Disk PooL# (1100451c)	LU# (1100451d)	LU Type (1100451e)	RAID Conf. (1100451f)	Usable Capacity (1100451g)	Used Capacity (1100451h)
OnLine Storage (Premium)	STR0	FC Pool	LU0	Local File	RAID1 1D+1P	140GB	53GB
OnLine Storage (Normal)	STR0	FC Pool	LU1	Local File	RAID5 4D+1P	560GB	125GB
NearLine Storage	STR0	SATA Pool	LU2	Local File	RAID5 8D+1P	1120GB	320GB
Archive Storage	STR1	SATA Pool	LU3	Remote File	RAID5 15D+1P	2100GB	480GB
Archive Storage	STR2	SATA Pool	LU4	Remote Block	RAID5 15D+1P	2100GB	480GB

Fig. 9

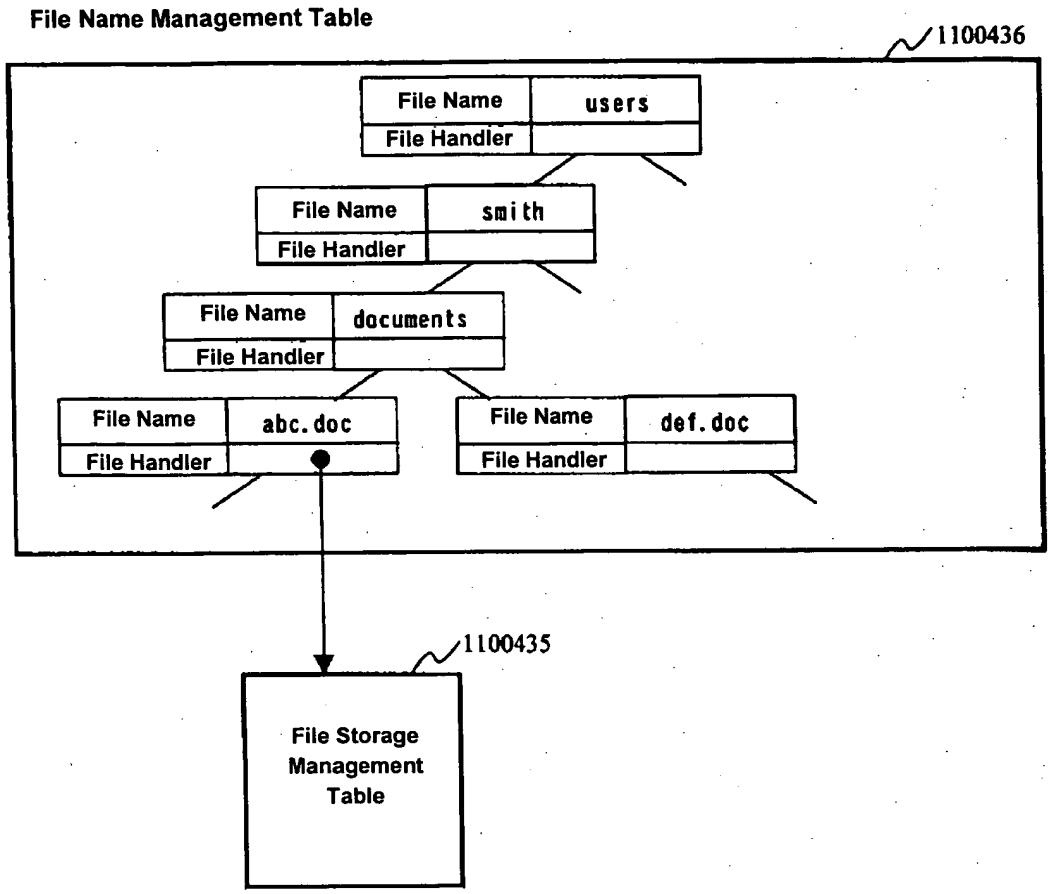

File Name Management Table
1100436
File Name
users
File Handler
File Name
smith
File Handler
File Name
documents
File Handler
File Name
abc.doc
File Handler
File Name
def.doc
File Handler
1100435
File Storage Management Table

Fig. 10

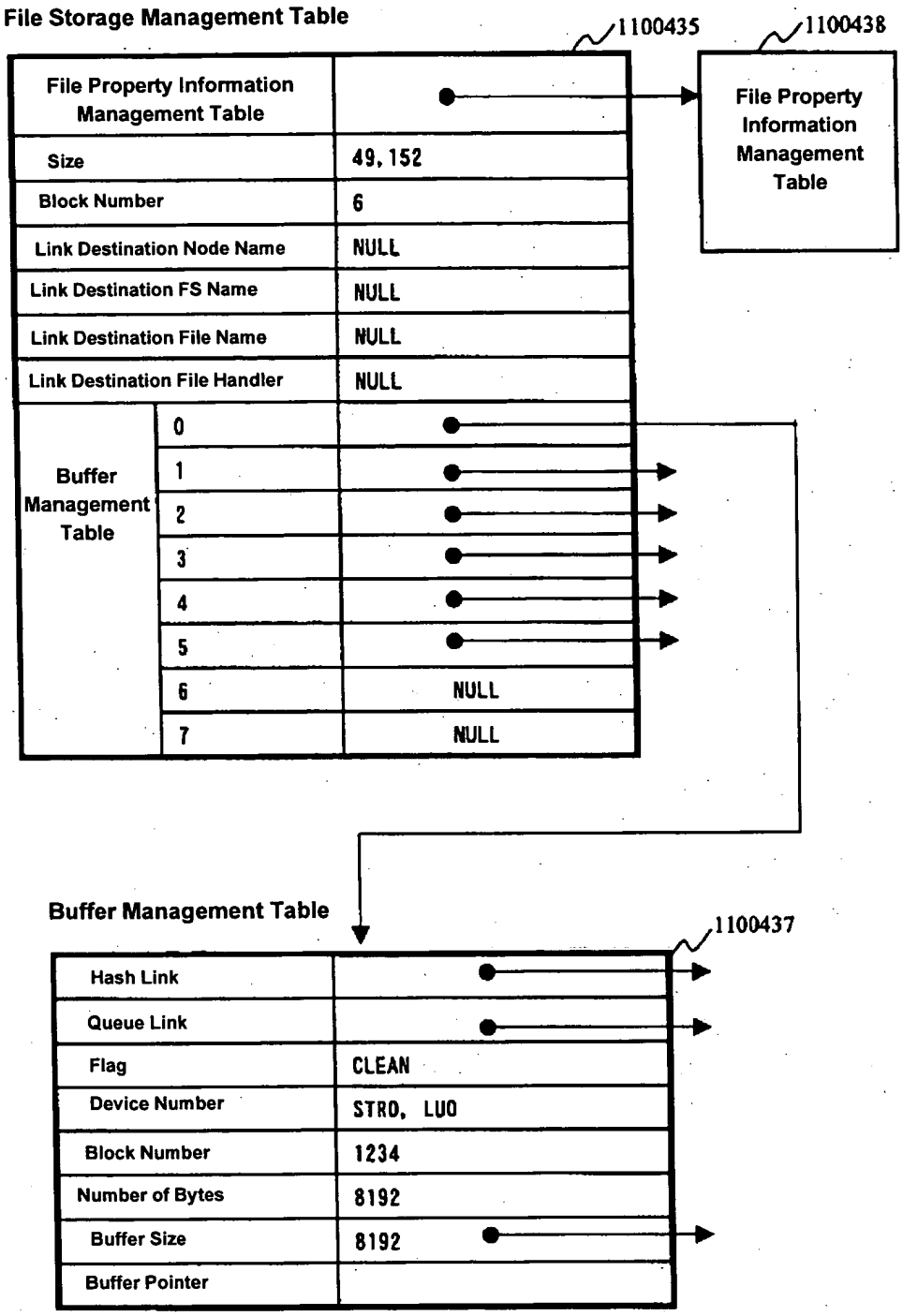

File Storage Management Table
1100435
1100438
File Property Information Management Table
File Property Information Management Table
Size
49, 152
Block Number
6
Link Destination Node Name
NULL
Link Destination FS Name
NULL
Link Destination File Name
NULL
Link Destination File Handler
NULL
Buffer Management Table
0
1
2
3
4
5
6
NULL
7
NULL
Buffer Management Table
1100437
Hash Link
Queue Link
Flag
CLEAN
Device Number
STRO, LUO
Block Number
1234
Number of Bytes
8192
Buffer Size
8192
Buffer Pointer

Fig. 11

File Property Information Management Table 1100438

Property Information Type	Category	Attribute	Content
Static Property Information	File Information	File Type	Document
		Application	XYZ Word
		Date Created	2002.11.25
		Owner	Smith
		Access Identifier	-rw-rw-rw-
	Policy	Initial Storage Class	Not designated
		Asset Value Type	Important
		Life Cycle Model	Model 1
		Migration Plan	Plan 1
Dynamic Property Information	Access Information	Time Stamp	2003.1.1
		Access Count	12
		Read Count	7
		Write Count	5
		Read Size	7,168
		Write Size	5,120
		Read Sequential Count	6
		Write Sequential Count	4
	Life Cycle stage Information	Current Life Cycle	Reference Stage
		Current Storage Class	NearLine

Fig. 12

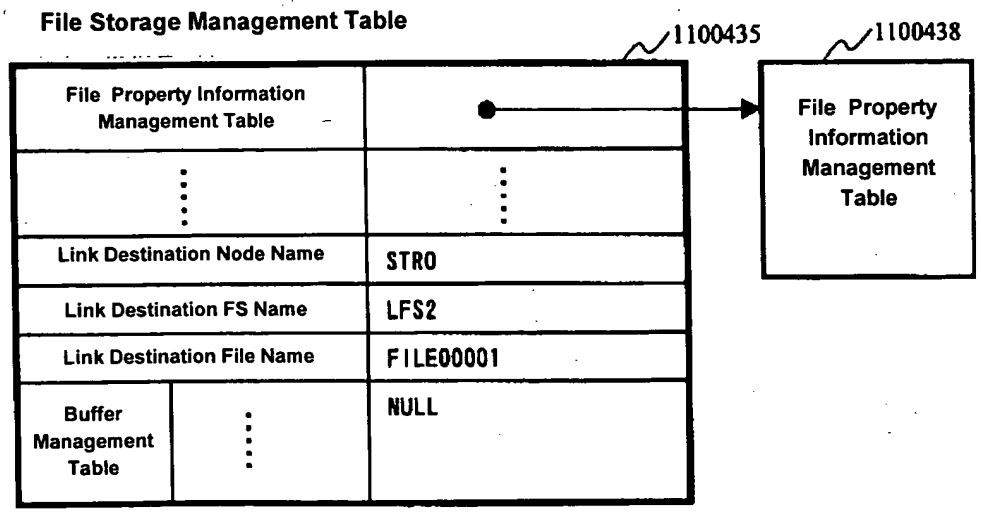


Fig. 13

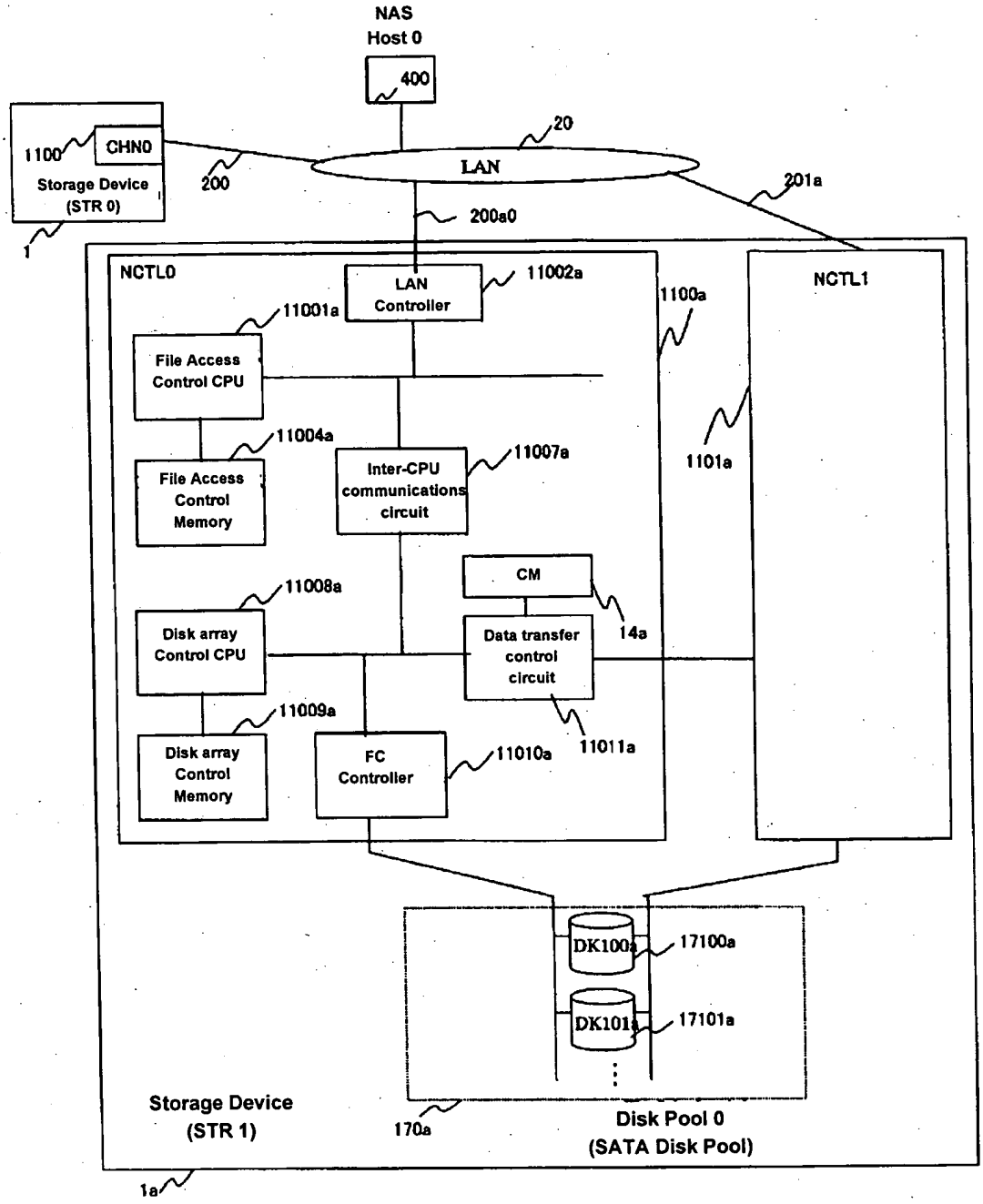

NAS
Host 0
400
20
LAN
1100
CHN0
Storage Device
(STR 0)
200
201a
200a0
1
NCTL0
LAN
Controller
11002a
11001a
1100a
NCTL1
File Access
Control CPU
11004a
File Access
Control
Memory
Inter-CPU
communications
circuit
11007a
1101a
CM
14a
11008a
Disk array
Control CPU
Data transfer
control
circuit
11009a
11011a
Disk array
Control
Memory
FC
Controller
11010a
DK100a
17100a
DK101a
17101a
Storage Device
(STR 1)
170a
Disk Pool 0
(SATA Disk Pool)
1a

Fig. 14

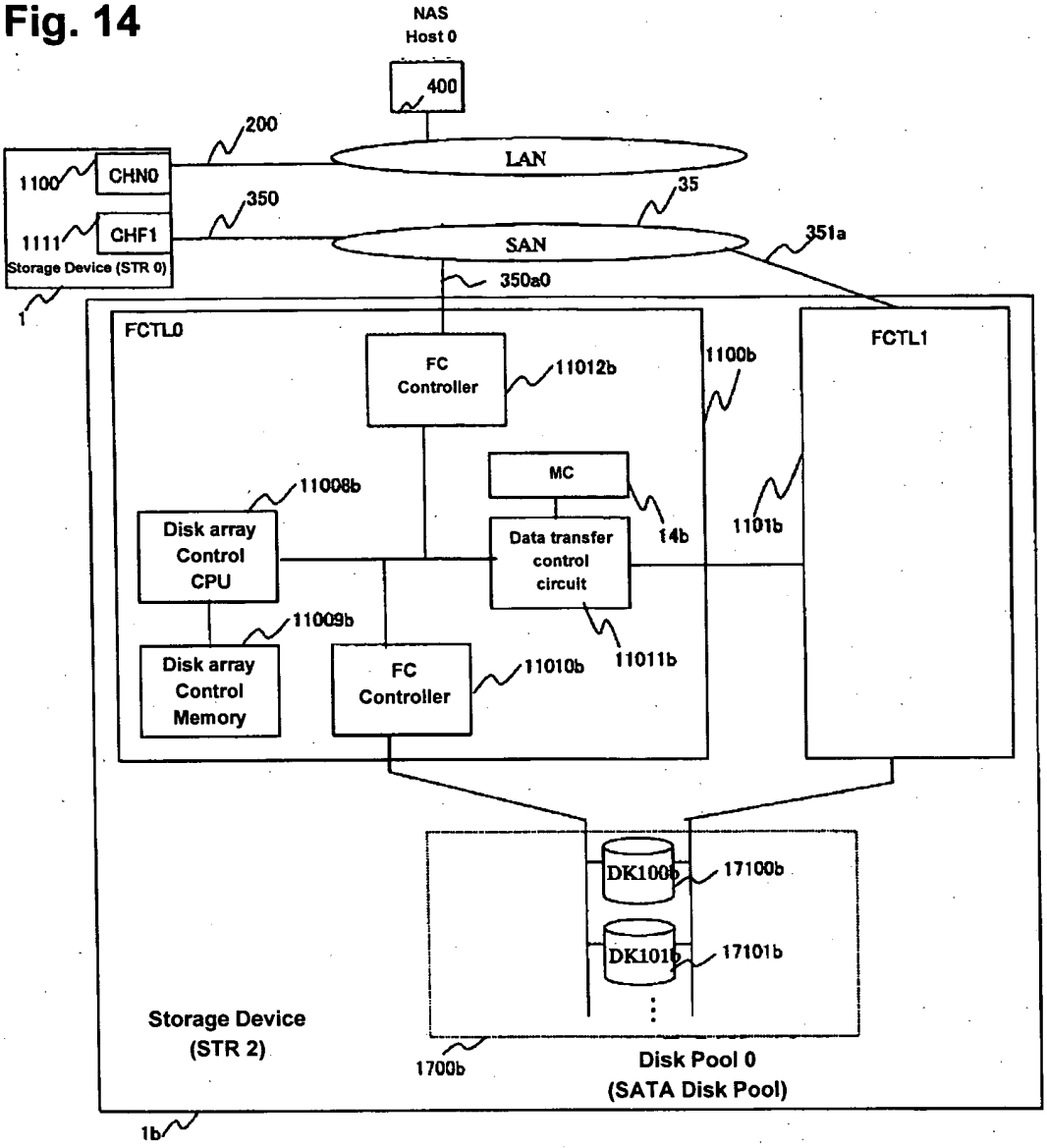

NAS
Host 0
400
200
LAN
1100
CHN0
350
35
1111
CHF1
SAN
351a
Storage Device (STR 0)
350a0
1
FCTL0
FC
Controller
11012b
1100b
FCTL1
MC
11008b
14b
1101b
Disk array
Control
CPU
Data transfer
control
circuit
11009b
11011b
Disk array
Control
Memory
FC
Controller
11010b
DK1000b
17100b
DK1010b
17101b
Storage Device
(STR 2)
1700b
Disk Pool 0
(SATA Disk Pool)
1b

Fig. 15

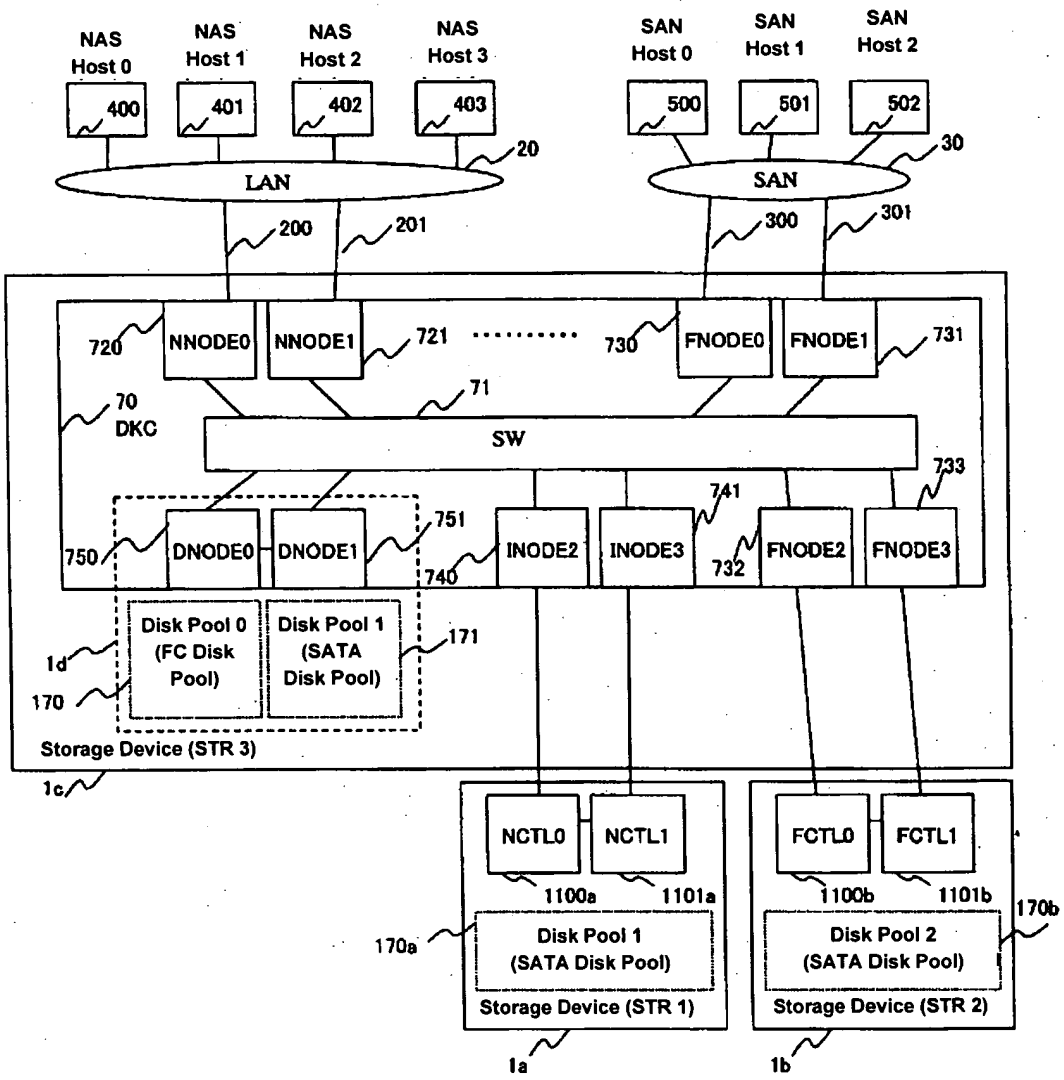

NAS Host 0
NAS Host 1
NAS Host 2
NAS Host 3
SAN Host 0
SAN Host 1
SAN Host 2
400
401
402
403
500
501
502
20
30
LAN
SAN
200
201
300
301
720
NNODE0
NNODE1
721
730
FNODE0
FNODE1
731
70
DKC
71
SW
733
741
750
DNODE0
DNODE1
751
740
INODE2
INODE3
732
FNODE2
FNODE3
Disk Pool 0 (FC Disk Pool)
Disk Pool 1 (SATA Disk Pool)
171
1d
170
Storage Device (STR 3)
1c
NCTL0
NCTL1
1100a
1101a
FCTL0
FCTL1
1100b
1101b
170a
Disk Pool 1 (SATA Disk Pool)
Storage Device (STR 1)
Disk Pool 2 (SATA Disk Pool)
Storage Device (STR 2)
170b
1a
1b

Fig. 16

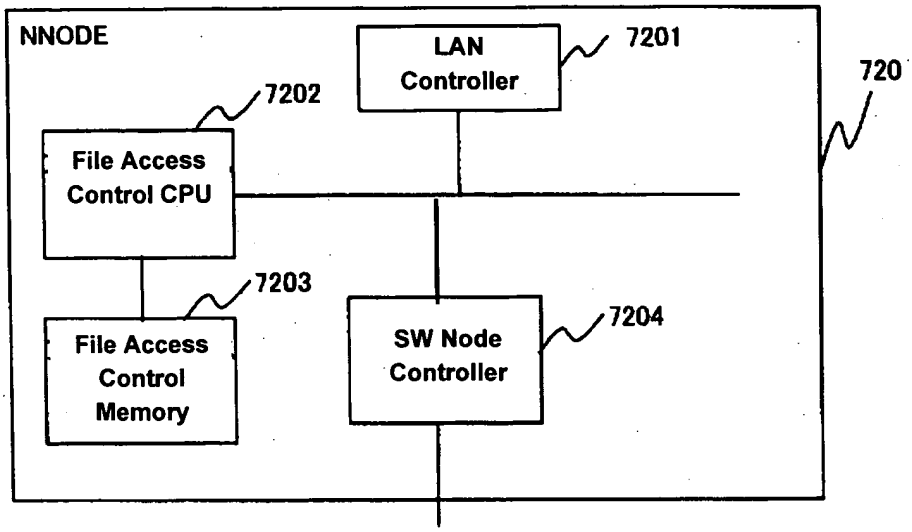

NNODE
LAN Controller
7201
720
7202
File Access Control CPU
7203
File Access Control Memory
SW Node Controller
7204

Fig. 17

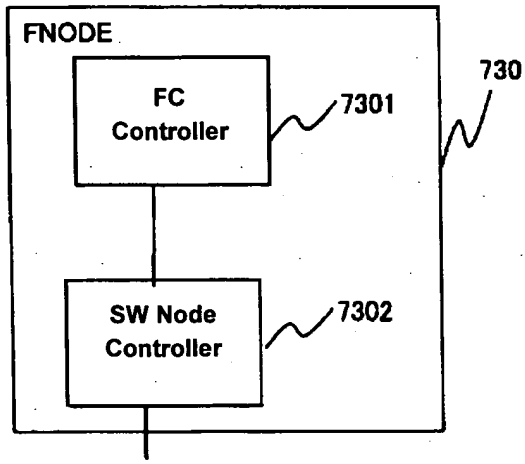

FNODE
730
FC Controller
7301
SW Node Controller
7302

Fig. 18

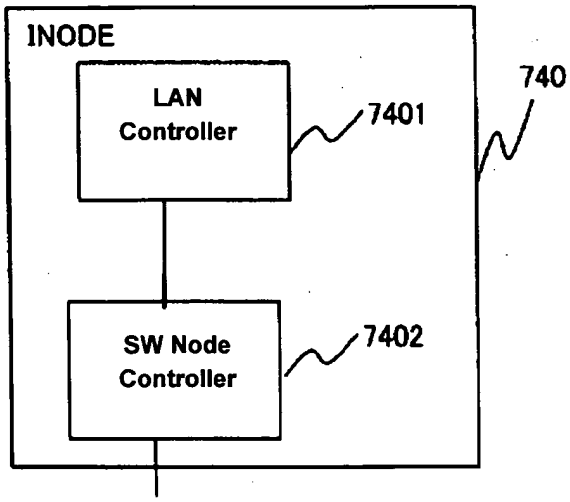
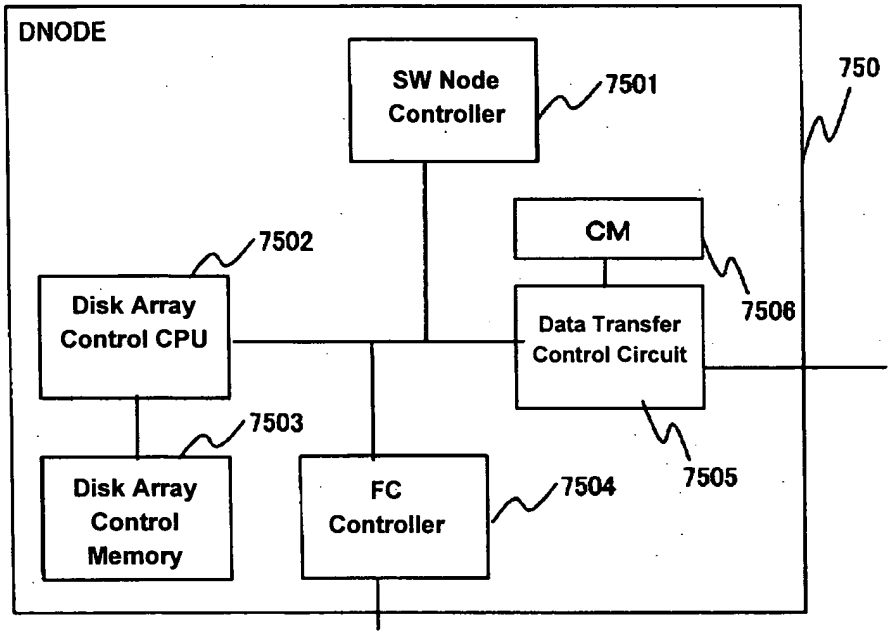

INODE
LAN Controller
7401
740
SW Node Controller
7402

Fig. 19


DNODE
SW Node Controller
7501
750
CM
7502
Disk Array Control CPU
7506
Data Transfer Control Circuit
7503
7505
Disk Array Control Memory
FC Controller
7504